Cruzane Mountain
Air Quality Report
Prepared by *Lorie Cotter*
Fuels AFMO
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Superior RD, Lolo NF

LEGAL FRAMEWORK

THE CLEAN AIR ACT

The basic framework for controlling air pollution in the United States is the 1963 Clean Air Act (CAA), as amended in 1970, 1977, and 1990 (42 U.S.C. §7401 et seq.). In 1999 minor changes were made to the CAA for visibility in sections 7491 and 7492. These changes were published on July 1, 1999, as the Regional Haze Rules (64 FR 35714). The CAA was designed to protect and enhance the quality of the Nation's air resources. The Act encourages reasonable Federal, State and local government actions for pollution prevention. State Implementation Plans (SIPs) are developed by each state to implement the provisions of the Clean Air Act. The SIPs describe the actions the State will take to achieve and maintain the "national ambient air quality standards" (NAAQS).

National Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has established NAAQS for six criteria pollutants that have been determined to be harmful to public and the environment. The primary standard is intended to protect human health. Montana's largest air pollution problem is particulate matter. Particulate is a term used to describe dispersed airborne solid and liquid particles that will remain in atmospheric suspension from a few seconds to several months. Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), or less than 10 microns in diameter (PM_{10}) describes particles small enough to enter the human respiratory system. Combustion processes produce ultra-fine particles which are primarily $PM_{2.5}$. $PM_{2.5}$ is the principal cause of haze since it seldom settles and is usually removed from the air by rain. PM_{10} settles in hours and is often pollen and spores with some dust. Most geological dust is larger than PM_{10}. Of particular concern to Forest management are forest fire smoke which is full of $PM_{2.5}$ affecting visibility and human health (Hammer 2000). Federal and State Air Quality Standards are listed below in Table 1.

FEDERAL & STATE AIR QUALITY STANDARDS				
Pollutant	**Time Period**	**Federal NAAQS**	**Montana (MAAQS)**	**Standard Type**
Carbon Monoxide	Hourly average	35 ppm[1]	23 ppm[b]	Primary
	8-hour average	9 ppm[1]	9 ppm[b]	Primary
Lead	90-day average	----	1.5 µg/m[2c]	---
	Quarterly average	1.5 ppm[3d]	----	Prim. & Sec.
Nitrogen Dioxide	Hourly average	100 ppb[m]	0.30 ppm[b]	Primary
	Annual average	53 ppb[3d]	0.05 ppm[e]	Prim. & Sec.
Ozone	Hourly average	0.12 ppm[f]	0.10 ppm[b]	Prim. & Sec.
	Annual average	0.08 ppm[g]	----	Prim. & Sec.
PM-10	24-hour average	150 µg/m[3k]	150 µg/m[2k]	Prim. & Sec.

FEDERAL & STATE AIR QUALITY STANDARDS				
Pollutant	**Time Period**	**Federal NAAQS**	**Montana (MAAQS)**	**Standard Type**
PM-2.5	24-hour average	35 µg/m^{3m}	-----	Prim. & Sec.
	Annual average	12 µg/m^{3n}	-----	Primary
		15 µg/m^{3}	-----	Secondary
Settleable Particulate	30-day average	----	10 g/m^{2c}	---
Sulfur dioxide	Hourly average	0.75 ppm^{o}	0.50 ppm^{h}	----
	3-hour average	0.50 ppm^{a}	---	Secondary
	24-hour average	0.14 ppm^{a,i}	0.10 ppm^{b,j}	Primary
	Annual average	0.03 ppm^{d}	0.02 ppm^{e}	Primary
Visibility	Annual average	-----	3 x 10^{-5}/m^{e}	----

Table 1: Federal and State Air Quality Standard Levels.

Should an area not meet or "fail to attain" a particular NAAQS, then that area is designated nonattainment for that standard. The state must then demonstrate, in the form of a state implementation plan, how the area will meet the standard in the future.

For the Cruzane Mountain project**,** the primary source of air emissions will be from prescribed fire smoke, thus the main NAAQS of concern will be particulate matter. The closest nonattainment area for particulate matter is Thompson Falls, MT, which is nonattainment for PM_{10} and lies approximately 13 air miles northeast of the project. Potential impacts to the Thompson Falls nonattainment area were considered in the development of this project.

Visibility Protection and Regional Haze

Within Class I areas, visibility is the air quality related value that is most affected by smoke from wildland fire. Particulates that remain suspended in the atmosphere are efficient light scatters and therefore contribute to visibility impairment. Very small particles can travel great distances and contribute to regional haze problems. Cumulative particulate load may be the result of fire only or urban and industrial sources only, or it may be a combination of the two.

The closest Class I areas to the Cruzane Mountain project is the Confederated Salish and Kootenai Tribes (CSKT) Reservation**,** approximately 35 air miles northeast of the project. These areas were considered in the development of this project, however little to no smoke intrusion is expected.

Conformity

The general conformity provisions of the CAA (Section 176 (c)), prohibit federal agencies from taking action within areas that are classified as non-attainment or maintenance that causes or contributes to a new violation of the standards, increases frequency or severity of an existing violation, or delays the timely attainment of a standard as defined in the area plan. The Cruzane Mountain project is not subject to a conformity analysis pursuant to 40 CFR § 93.153(c)(4), which states prescribed fire actions that comply with an approved land management plan and a certified state Smoke Management Plan are presumed to comply.

Interim Air Quality Policy for Wildland and Prescribed Fire

EPA promulgated the Interim Air Quality Policy for Wildland and Prescribed Fire (the Policy) in 1998 in order to provide guidance to states and tribes on allowing prescribed fire as a land management tool while meeting air quality goals. The Policy offers incentives to states and tribes that develop a certified smoke management program should smoke from a prescribed fire cause an area to achieve non-attainment status.

In accordance with the Policy, the State of Montana has implemented a certified Smoke Management Program (SMP). This program includes regulations listed in Title 17, Chapter 8, Subchapter 6 of the Administrative Rules of Montana (ARM). In compliance with ARM 17.8.610, the Forest Service obtains a major open burning permit annually from the State, and agrees to utilize Best Available Control Technology (BACT) (as defined in ARM 17.8.601(1)) and observe the provisions of the open burning permit. As part of the SMP, burns are coordinated through the MT/ID Airshed Group (www.smokemu.org). Member burners of the MT/ID Airshed Group submit burn requests to the Smoke Monitoring Unit, which coordinates and approves prescribed burning activities in an agreement with Montana Department of Environmental Quality, in a manner designed to meet ambient air quality standards and comply with BACT requirements.

As a member of the MT/ID Airshed Group, the Forest Service will submit all prescribed burn requests for the Cruzane Mountain project through the Smoke Monitoring Unit for approval, in accordance with procedures outlined in the MT/ID Airshed Group Operating Guide. The Forest Service will operate underneath the permits defined by the Department of Environmental Quality**,** coordinate with Regional and Smoke Coordinators, submit spot weather forecasts, and make appropriate public notifications.

STATE REGULATIONS

Prescribed burning activities are done in accordance with the open burning regulations as outlined in Title 17, Chapter 8, Subchapter 6 of the Administrative Rules of Montana (ARM). In compliance with ARM 17.8.610, the Forest Service obtains a major open burning permit annually from the State and agrees to utilize Best Available Control Technology (as defined in ARM 17.8.601(1)) and observe the provisions of the open burning permit.

AFFECTED ENVIRONMENT

Table 2 displays the receptors identified within 50 miles of the Cruzane Mountain project. After 50 miles modeling tends to display good dispersion and minimal, if any, impacts to receptors.

Receptor Name	Distance from Project (Miles)	Direction from Project
Kellogg, ID	35 miles	west
Thompson Falls, MT	15 miles	north
CSKT Reservation	65 miles	east
Cabinet Mountain Wilderness	50 miles	north

Table 2: Distance and Direction to Receptors from the Cruzane Mountain project

Air quality in the Cruzane Mountain area is generally excellent with limited local emission sources. Existing sources of emissions include occasional construction equipment, vehicles,

road dust, residential wood burning, wood fires, and smoke from logging slash disposal. Emissions are limited with no local visible sources of impairment. The entire project area is considered to be in attainment for all NAAQS.

DIRECT AND INDIRECT EFFECTS

Alternative A: No Action

Under the No Action Alternative there would be an increasing potential for wildfire emissions as the current condition progresses toward higher fuels loads. In the short term, the air quality impacts from the No Action Alternative would be less than the Action Alternative since the proposed prescribed burning would not occur. However, in the long term, the No Action Alternative would not allow for the opportunity to reduce the potential of wildfire ignition in the treatment areas. Wildfires have the potential to result in extensive smoke and air quality impacts from $PM_{2.5}$ and PM_{10} emissions. Alternative A would forgo the opportunity to reduce the likelihood of intensive short-term air quality impacts that result from a wildfire.

Alternative B: Proposed Action

Direct effects from the proposed action include $PM_{2.5}$ and PM_{10} emissions from under burning and pile burning activities. Potential air quality impacts from the Cruzane Mountain project were calculated for $PM_{2.5}$ and PM_{10} levels using the First Order Fire Effects Model (FOFEM) 6.5. For all burning methods the following Society of American Foresters (SAF) cover types were modeled: SAF 210 Interior Douglas-fir, SAF and SAF 237 Interior Ponderosa Pine. The FOFEM outputs for $PM_{2.5}$ and PM_{10} are displayed in Table 3.

The Proposed Action (Alt B) would significantly reduce fuel continuity and arrangement over the area to various degrees. FOFEM output values indicate a trend in reducing potential wildfire smoke emissions under post-treatment conditions for both $PM_{2.5}$ and PM_{10} emissions. Once all treatments are completed with the action alternative, emissions would be reduced in the event of a wildfire. If a wildfire occurred post-treatment, $PM_{2.5}$ emissions would be reduced approximately ***73% - 75%*** across the analyzed SAF models. Under the same circumstances, PM_{10} emissions would be reduced similarly at approximately ***73% - 75%.***

Model results for both alternatives display that emissions would noticeably be created during prescribed burning activities and wildfires. In the event of a wildfire, post-treatment, resultant stand conditions from the Proposed Action (Alt B) show that the level of $PM_{2.5}$ and PM_{10} emissions in lbs./acre are less than what is displayed from a severe wildfire event in Alternative A - No Action. In the cases where lbs./acre is more, the proposed treatments would create short-term impacts from prescribed burning as opposed to long durations of smoke from severe wildfire events. Under good smoke dispersion days, distance from the unit would allow for smoke to become properly dispersed.

However, both action alternatives would most likely increase nuisance smoke during the prescribed fire implementation timeframe. Problem or nuisance smoke is defined by the EPA as the amount of smoke in the ambient air that interferes with a right or privilege common to members of the public, including the use or enjoyment of public or private resources. While there are no laws or regulations governing nuisance smoke, it can limit opportunities for land managers to use fire. Public concerns regarding nuisance smoke often occur long before smoke exposures reach levels that violate NAAQS. The most common air quality issues facing wildland fire managers are those related to public complaints about nuisance smoke, about the

odor or soiling effects of smoke, poor visibility, and impaired ability to breathe or other health-related effects. Sometimes complaints come from the fact that some people don't like or are fearful of smoke intruding into their lives (Hardy et al. 2001). Prescribed fire treatments proposed in the action alternatives may result in an increase of nuisance smoke; however, it is not anticipated to result in a NAAQS violation.

The Forest Service will acknowledge the sensitive smoke receptors within the project vicinity, adhere to regulatory requirements, employ the Basic Smoke Management Practices, and provide qualitative data to illustrate emission levels pre and post treatment. Table 3 shows pollutant levels for $PM_{2.5}$ and PM_{10} and the impacts of pretreatment versus post treatment levels.

Table 3 displaying FOFEM outputs for $PM_{2.5}$ and PM_{10} emissions

SAF Cover Type	SAF 210 – Interior Douglas Fir	SAF 237 – Interior Ponderosa Pine
Alt. A (No Action) Potential $PM_{2.5}$ Emissions from Wildfire in Current Condition (lbs./acre)	1028 lbs/ac	585 lbs/ac
***Proposed Action* Potential $PM_{2.5}$ Emissions from Prescribed Burning (lbs./acre)**	528 lbs/ac	296 lbs/ac
Result of *Proposed Action* Potential $PM_{2.5}$ Emissions from Wildfire Post Treatment (lbs./acre)	273 lbs/ac	145 lbs/ac
Alt. A (No Action) Potential PM_{10} Emissions from Wildfire in Current Condition (lbs./acre)	1214 lbs/ac	690 lbs/ac
***Proposed Action* Potential PM_{10} Emissions from Prescribed Burning (lbs./acre)**	623 lbs/ac	350 lbs/ac
Result of *Proposed Action* Potential PM_{10} Emissions from Wildfire Post Treatment (lbs./acre)	323 lbs/ac	172 lbs/ac

MITIGATION ACTIONS

To lessen the potential for smoke impacts from the Cruzane Mountain project activities, the following mitigation actions will be considered and used when and where appropriate:

- **Best Available Control Technology:** As per the Forest Service Open burning permit with the State of Montana, Best Available Control Technology will be used to limit impacts from burning operations. This includes submitting and obtaining burn approval

from the MT/ID Airshed Group prior to ignition, and burning only during times of at least good ventilation.

- **Public Notification:** All residents within the burn area will be personally notified prior to any prescribed burning. Signs will also be posted as needed along roads warning of potential visibility impairment from smoke. Media and Facebook releases may also occur.
- **Splitting Burn Blocks:** Larger burn blocks may be burned over multiple days in order to reduce the short term smoke impacts. For pile burning, short term impacts may be lessened by reducing the number of piles burned.
- **Refined Smoke Modeling:** The First Order Fire Effects Model 6.5 was used to determine $PM_{2.5}$ and PM_{10} levels for pre and post treatment conditions. The model calculated the amount of $PM_{2.5}$ and PM_{10} emissions that would result from a wildfire in its natural state, emissions from prescribed burning from treatment, and a wildfire in its natural state in post treatment conditions.
- **Monitoring:** All prescribed burns will be actively monitored visually. If any prescribed burn appears to be generating too much smoke, measures will be taken to shut down burning operations. In addition, smoke monitors can be placed in populated areas to measure public exposure to smoke.
- **Mop Up:** If any prescribed burn appears to be generating nuisance smoke for days after ignition is complete, those areas may be extinguished.

LITERATURE CITED

Hardy, C. C., R. D. Ottmar, J. L. Peterson, J. E. Core & P. E. Seamon. 2001. Smoke management guide for prescribed and wildland fire. 226. Boise, ID.